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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/542,787      | 02/06/2006  | Kenichi Wakui        | 274940US0PCT        | 9324             |

  

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| 22850  | 7590 | 11/04/2008 |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. |      |            |
| 1940 DUKE STREET                                 |      |            |
| ALEXANDRIA, VA 22314                             |      |            |

  

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| EXAMINER           |  |
| HAILEY, PATRICIA L |  |

  

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| ART UNIT | PAPER NUMBER |
| 1793     |              |

  

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|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 11/04/2008        | ELECTRONIC    |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

|                              |                                       |                                       |  |
|------------------------------|---------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/542,787  | <b>Applicant(s)</b><br>WAKUI, KENICHI |  |
|                              | <b>Examiner</b><br>PATRICIA L. HAILEY | <b>Art Unit</b><br>1793               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 7-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/31/2008</u>  | 6) <input type="checkbox"/> Other: _____                          |

Applicants' remarks and amendments, filed on July 31, 2008, have been carefully considered. Claims 1-6 have been canceled; new claims 7-17 have been added.

Claims 7-17 are now pending in this application.

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Applicants' Priority Document was filed on July 20, 2005.

### ***Withdrawn Rejection***

The 103(a) rejection of claims 1-6 as being unpatentable over Japanese Patent No. 11-180902 in view of Miller et al. (U. S. Patent No. 4,340,465), stated in the previous Office Action, has been withdrawn in view of Applicants' cancellation of these claims.

### ***New Ground of Rejection***

The following New Ground of Rejection is being made in view of the Examiner's reconsideration of the references of record, and in view of Applicants' addition of new claims 7-17; the text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

*Claim Rejections - 35 USC § 103*

2. *Claims 7-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. 11-180902 in view of Friedrich (U. S. Patent No. 3,669,877) and Miller et al. (U. S. Patent No. 4,340,465).*

The Japanese Patent teaches a process for the catalytic cracking of a hydrocarbon to produce lower olefins (paragraph [0003]), wherein the reaction takes place in the presence of a catalyst supporting a rare earth element in an amount of 0.4-20, expressed in terms of atomic ratio to aluminum in a crystalline aluminosilicate zeolite (as recited in **claims 9 and 10**). See the Abstract of the Japanese Patent.

Exemplary feedstocks include hydrocarbon raw materials having from 2 to 30 carbon atoms (as recited in **claim 16**), such as paraffins (e.g., ethane, propane, butane, pentane, hexane, naphtha, and gas oil, as recited in **claim 17**); see paragraph [0005] of the Japanese Patent.

The zeolite component of the catalyst preferably exhibits a  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio of from 25-800 (as recited in **claims 11 and 12**), and examples of the rare earth component include lanthanum, cerium, praseodymium, neodymium, samarium, gadolinium, dysprosium (as recited in **claim 8**), etc. See paragraph [0006] of the Japanese Patent.

In paragraph [0009] of the Japanese Patent, cracking conditions such as a fixed bed or fluid bed (synonymous with “fluidized bed”, as recited in **claim 7**), a steam supply of 0.1-1 wt. % in the hydrocarbon feed (as recited in **claims 13 and 14**), and temperatures ranging from about 350°C to about 780°C are depicted.

The Japanese Patent does not specifically disclose that the fluid bed ("fluidized bed") "permits continuous regeneration of the catalyst". However, Friedrich teaches that it is known in the art of fluidized bed catalytic reactions to employ the catalysts in a continuous regeneration operation, see col. 1, lines 12-18. One of ordinary skill in the art would reasonably expect that the fluid bed disclosed in the Japanese Patent would permit continuous regeneration of the catalyst, in view of Applicants' definition of this phrase at page 7, lines 27-33. Further, it would have been obvious to one of ordinary skill in the art to employ a fluidized bed permitting continuous regeneration of the catalyst, which leads to lower attrition rates for the catalyst, reduces catalyst loss, and maximizes the performance characteristics of the reaction system, as taught by Friedrich, see col. 1, lines 28-53.

Additionally, the Japanese Patent does not specifically disclose the pressure conditions, catalyst to hydrocarbon mass ratio, or the contacting time (also recited in **claim 15**) recited in **claim 7**.

Miller et al. is relied upon to show conventional process conditions for catalytically cracking a hydrocarbonaceous feedstock with a catalyst comprising rare earth-containing zeolites (col. 7, lines 23-37 and col. 8, lines 15-44).

Exemplary cracking conditions include a temperature from about 425°C to about 650°C, a pressure ranging from about 0 to about 6 atmospheres (0 to 607.95 kPa), a catalyst to hydrocarbon weight ratio (considered equivalent to "mass ratio") of from

about 2 to 15, and residence or contact times from about 0.3 to 10 seconds. See col. 3, lines 21-44 of Miller et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of the Japanese Patent by incorporating therein the conventional catalytic cracking conditions of Miller et al., motivated by the references' common teachings regarding the catalytic cracking of hydrocarbons, in the presence of crystalline aluminosilicate zeolites containing rare earth components, as well as the references' comparable process conditions.

### *Response to Arguments*

In response to Applicants' arguments that the cited references of record do not disclose "a system which achieves regeneration of the catalyst in the production of ethylene and propylene light gases", the Examiner respectfully submits that Applicants' claims, which are directed to a process for producing light olefins, are not directed to such a system. Further, because the cited references disclose a fluid bed or fluidized bed (see also col. 3, lines 33-37 of Miller et al., which discloses "dense-bed fluidized catalyst contact" as a conventional contact between catalyst and feed hydrocarbons in cracking processes), the skilled artisan would find reasonable expectation that a fluid bed would permit continuous regeneration of a catalyst. See also col. 1, lines 28-53 of Friedrich (U. S. Patent No. 3,669,877), which discusses continuous regeneration of a catalyst in a fluidized bed.

Further, Miller et al. is relied upon merely for its teachings regarding conventional process conditions for catalytically cracking a hydrocarbonaceous feedstock with a catalyst comprising rare earth-containing zeolites (col. 7, lines 23-37 and col. 8, lines 15-44). The fact that this reference may teach a feed containing "significant amounts of aromatics" does not detract it from curing the deficiencies of the Japanese Patent.

For these reasons, Applicants' arguments are not persuasive.

### *Conclusion*

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICIA L. HAILEY whose telephone number is (571)272-1369. The examiner can normally be reached on Mondays-Fridays, from 7:00 a.m. to 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICIA L. HAILEY/  
Examiner, Art Unit 1793  
October 29, 2008